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מכלול לפלט בוועות ושיטה עברו

(בעברית)  
(Hebrew)

BUBBLE VIAL ASSEMBLY AND METHOD THEREFOR

(באנגלית)  
(English)

בקשות זיהוי ותיקון		דרישה דין קידום Priority Claim		
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**מכלול לפלט בונות ושיטה נבורנו**  
**Bubble Vial Assembly and**  
**Method Therefor**

## BUBBLE VIAL ASSEMBLY AND METHOD THEREFOR

### FIELD OF THE INVENTION

The present invention relates generally to spirit levels and methods for their construction, and particularly to a bubble vial assembly and method for mounting in a spirit level.

### BACKGROUND OF THE INVENTION

Spirit levels are well known instruments used to plumb or set surfaces, such as horizontal or vertical surfaces. Spirit levels generally include one or more bubble vials, in which a fluid (e.g., mineral spirits, kerosene, or similar substances) is encapsulated within a sealed transparent (or at least translucent) body with an air space providing a visible bubble. Although glass was originally used to make bubble vials, today acrylic is the material predominantly used for making molded vials, although other plastics are also used.

One type of bubble vial is a tubular bubble vial, comprising an elongate transparent tube with a slight curvature formed therein. When the bubble vial is positioned substantially horizontally, the air bubble rises to the top of the curvature and is situated between two markings, transverse to the longitudinal axis of the body. Tubular bubble vials are generally used for checking the level of a surface or object in one dimension, e.g., horizontal or vertical surfaces.

### SUMMARY OF THE INVENTION

The present invention seeks to provide an improved bubble vial assembly and method for mounting in a spirit level, as is described in detail hereinbelow.

There is thus provided in accordance with a preferred embodiment of the present invention a bubble vial assembly including a retaining element slidable over a tubular bubble vial, the retaining element being matable with a portion of a spirit level.

In accordance with a preferred embodiment of the present invention the retaining element includes a ring-shaped body with a hole formed therethrough and a tubular bubble vial received in the hole.

Further in accordance with a preferred embodiment of the present invention the spirit level is formed with a mounting recess, and includes a mounting member matable with the retaining element.

Still further in accordance with a preferred embodiment of the present invention the retaining element has a groove formed on an outer face thereof transverse to the hole, and

the mounting member includes a mounting lug receivable in the groove. The mounting member may be formed with a notch for receiving therein the tubular bubble vial.

In accordance with a preferred embodiment of the present invention the tubular bubble vial is positioned between a pair of the mounting members and a pair of the retaining elements are attached to the mounting members at opposite ends of the tubular bubble vial.

Further in accordance with a preferred embodiment of the present invention the mounting members and the retaining elements restrict linear movement of the tubular bubble vial.

There is also provided in accordance with a preferred embodiment of the present invention a method for assembling a bubble vial in a spirit level, including placing a tubular bubble vial, with retaining elements disposed on opposite ends of the tubular bubble vial, in a bubble vial mounting recess formed in a spirit level, the spirit level including mounting members mateable with the retaining elements, and securing the tubular bubble vial in the spirit level by attaching the retaining elements to the mounting members.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description taken in conjunction with the drawings in which:

Fig. 1 is a simplified exploded illustration of a bubble vial assembly prior to assembly in a spirit level, in accordance with a preferred embodiment of the present invention, comprising a tubular bubble vial and retaining elements;

Fig. 2 is a simplified pictorial illustration of the bubble vial assembly of Fig. 1, showing the retaining elements mounted on ends of the tubular bubble vial, in accordance with a preferred embodiment of the present invention;

Fig. 3 is a simplified pictorial illustration of the bubble vial assembly of Fig. 1, showing the bubble vial mounted between mounting members formed in a spirit level, in accordance with a preferred embodiment of the present invention; and

Fig. 4 is a simplified pictorial illustration of the bubble vial assembly of Fig. 1, showing the retaining elements securing the bubble vial to the mounting members, in accordance with a preferred embodiment of the present invention.

#### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is now made to Fig. 1, which illustrates a bubble vial assembly 10, in accordance with a preferred embodiment of the present invention.

Bubble vial assembly 10 may comprise a tubular bubble vial 12, which may be made of any suitable material used for making bubble vials, such as but not limited to, acrylic. Bubble vial 12 may be mounted in a spirit level 14, as described further hereinbelow. Spirit level 14 may be made of any suitable material, such as but not limited to, plastic or metal.

Bubble vial 12 may be mounted in spirit level 14 by means of one or more retaining elements 16. Retaining elements 16 may also be made of any suitable material, such as but not limited to, plastic or metal. In the illustrated embodiment, retaining element 16 may comprise a ring-shaped body 18 with a hole 20 formed therethrough. One face 22 of retaining element 16 may be formed with a groove 24 transverse to hole 20. Hole 20 may be sized so that retaining element 16 may be snugly slid over bubble vial 12.

Spirit level 14 may be formed with one or more recesses 26 for receiving therein one or more bubble vials 12. The bubble vials 12 may be mounted in spirit level 14 for setting any angle, such as but not limited to, 0°, 45° or 90°. Each retaining element 16 may be attached to a mounting member 28 provided in the vicinity of each recess 26. In the illustrated embodiment, mounting member 28 may comprise a mounting lug 30 that protrudes into recess 26. Mounting lug 30 may have a shape complementary to the shape of groove 24 such that retaining element 16 may be mated with mounting lug 30 by pushing retaining element 16 into mounting lug 30. Mounting lug 30 may be formed with a notch 32 for receiving bubble vial 12 therein.

Fig. 1 illustrates bubble vial 12 prior to assembly in spirit level 14, and prior to assembly with retaining elements 16.

Reference is now made to Fig. 2, which illustrates a pair of retaining elements 16 mounted on opposite ends of the tubular bubble vial 12. Retaining elements 16 have been snugly slid over bubble vial 12 in the direction of arrows 34.

Reference is now made to Fig. 3, which illustrates mounting bubble vial 12 between mounting lugs 30. Bubble vial 12 may fit snugly in notches 32 of mounting lugs 30, thereby restricting linear movement of bubble vial 12 in a longitudinal direction indicated by arrows 36 and in a lateral direction (up and down in the sense of Fig. 3) indicated by arrows 38.

Reference is now made to Fig. 4, which illustrates retaining elements 16 securing bubble vial 12 to mounting lugs 30. Retaining elements 16 have been moved in the direction of arrows 40, and may click or snap over mounting lugs 30, and are locked in

place. In this position, retaining elements 16 may restrict linear movement of bubble vial 12 in a transverse direction indicated by arrows 42.

Persons skilled in the art will appreciate that other variations of the construction of retaining elements 16 and mounting members 28 are possible within the scope of the present invention. For example, in the illustrated embodiment, groove 24 serves as a female connector that mates with mounting lug 30, which serves as the male connector. Alternatively, retaining element 16 may be formed with a protrusion (e.g., tenon or key) that mates with a correspondingly formed groove in the spirit level 14 (e.g., mortise or keyway).

It will be appreciated by person skilled in the art, that the present invention is not limited by what has been particularly shown and described herein above. Rather the scope of the present invention is defined only by the claims that follow:

5  
CLAIMS

What is claimed is:

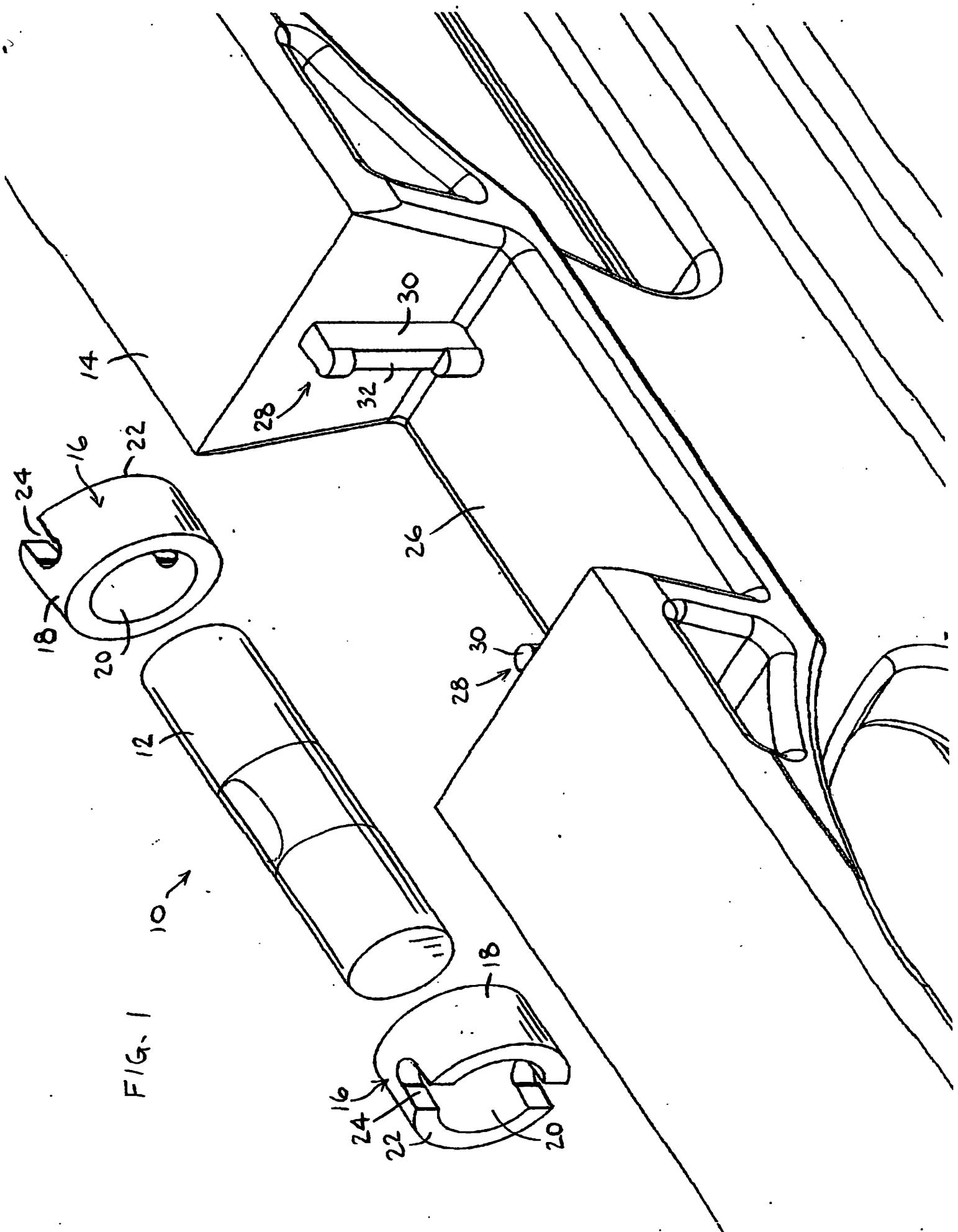
1. A bubble vial assembly comprising:  
a retaining element slidable over a tubular bubble vial, said retaining element being matable with a portion of a spirit level.
2. The bubble vial assembly according to claim 1 wherein said retaining element comprises a ring-shaped body with a hole formed therethrough and a tubular bubble vial received in said hole.
3. The bubble vial assembly according to claim 2 and further comprising a spirit level formed with a mounting recess, said spirit level comprising a mounting member matable with said retaining element.
4. The bubble vial assembly according to claim 3 wherein said retaining element has a groove formed on an outer face thereof transverse to said hole, and said mounting member comprises a mounting lug receivable in said groove.
5. The bubble vial assembly according to claim 3 or claim 4 wherein said mounting member is formed with a notch for receiving therein said tubular bubble vial.
6. The bubble vial assembly according to claim 5 wherein said tubular bubble vial is positioned between a pair of said mounting members and a pair of said retaining elements are attached to said mounting members at opposite ends of said tubular bubble vial.
7. The bubble vial assembly according to claim 6 wherein said mounting members and said retaining elements restrict linear movement of said tubular bubble vial.
8. A method for assembling a bubble vial in a spirit level, comprising:  
placing a tubular bubble vial, with retaining elements disposed on opposite ends of said tubular bubble vial, in a bubble vial mounting recess formed in a spirit level, said spirit level comprising mounting members matable with said retaining elements; and  
securing said tubular bubble vial in said spirit level by attaching said retaining elements to said mounting members.
9. The method according to claim 8 wherein said retaining elements are disposed on said tubular bubble vial by sliding over said tubular bubble vial.

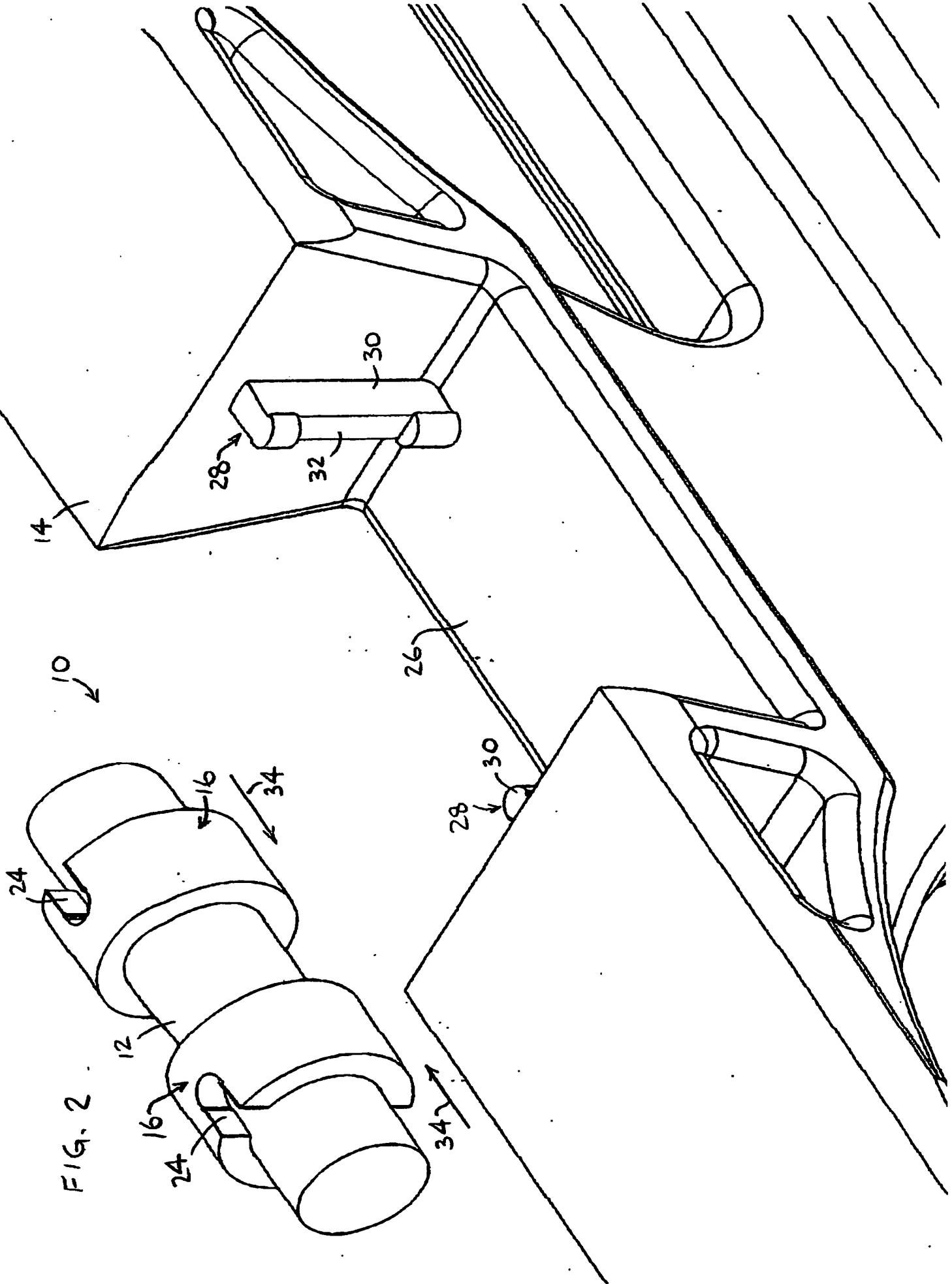
10. The bubble vial assembly according to any of claims 1-7 and substantially as shown and described hereinabove.

For the Applicant,

David Klein, Patent Attorney  
Dekel Patent Ltd.

FIG. 1





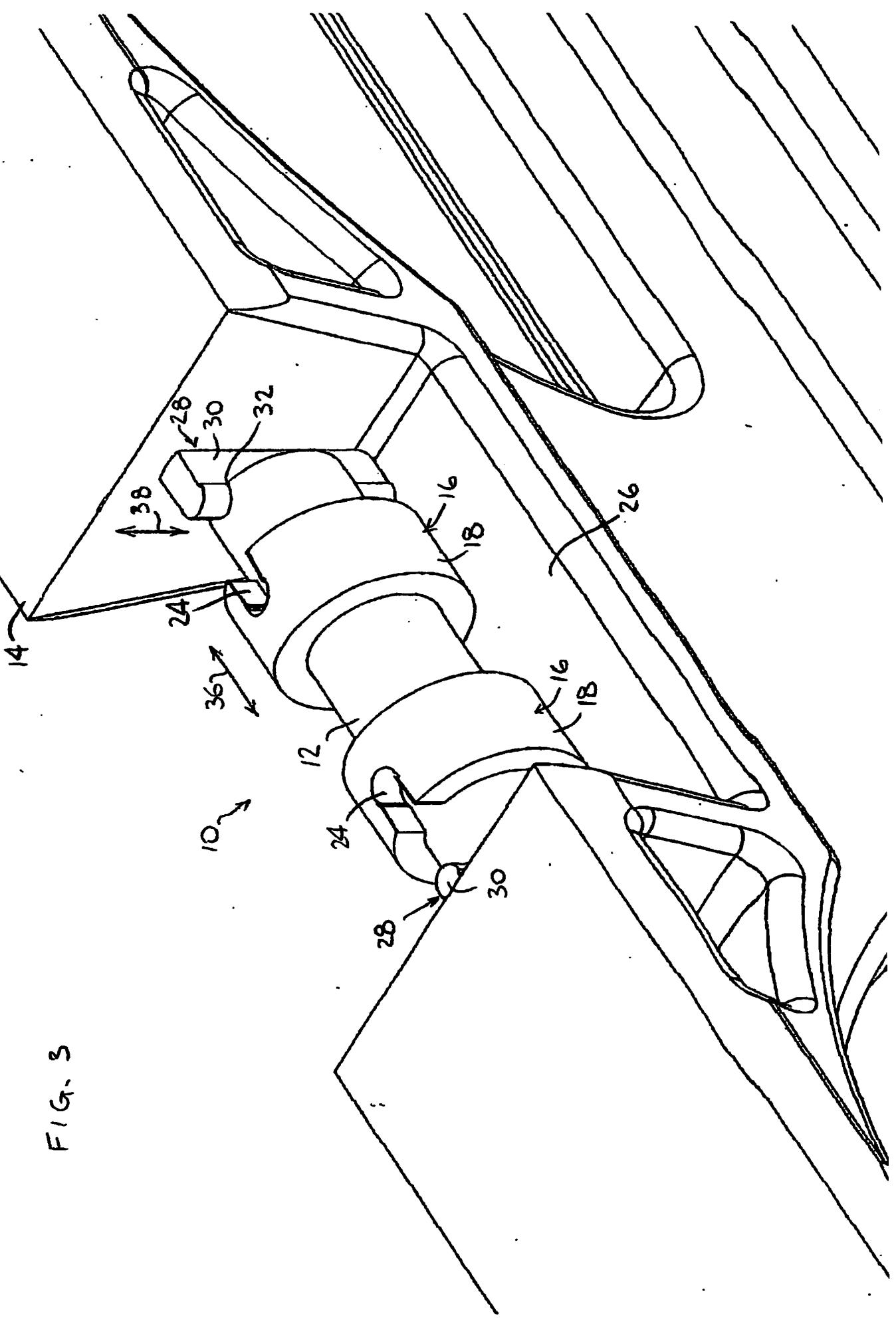
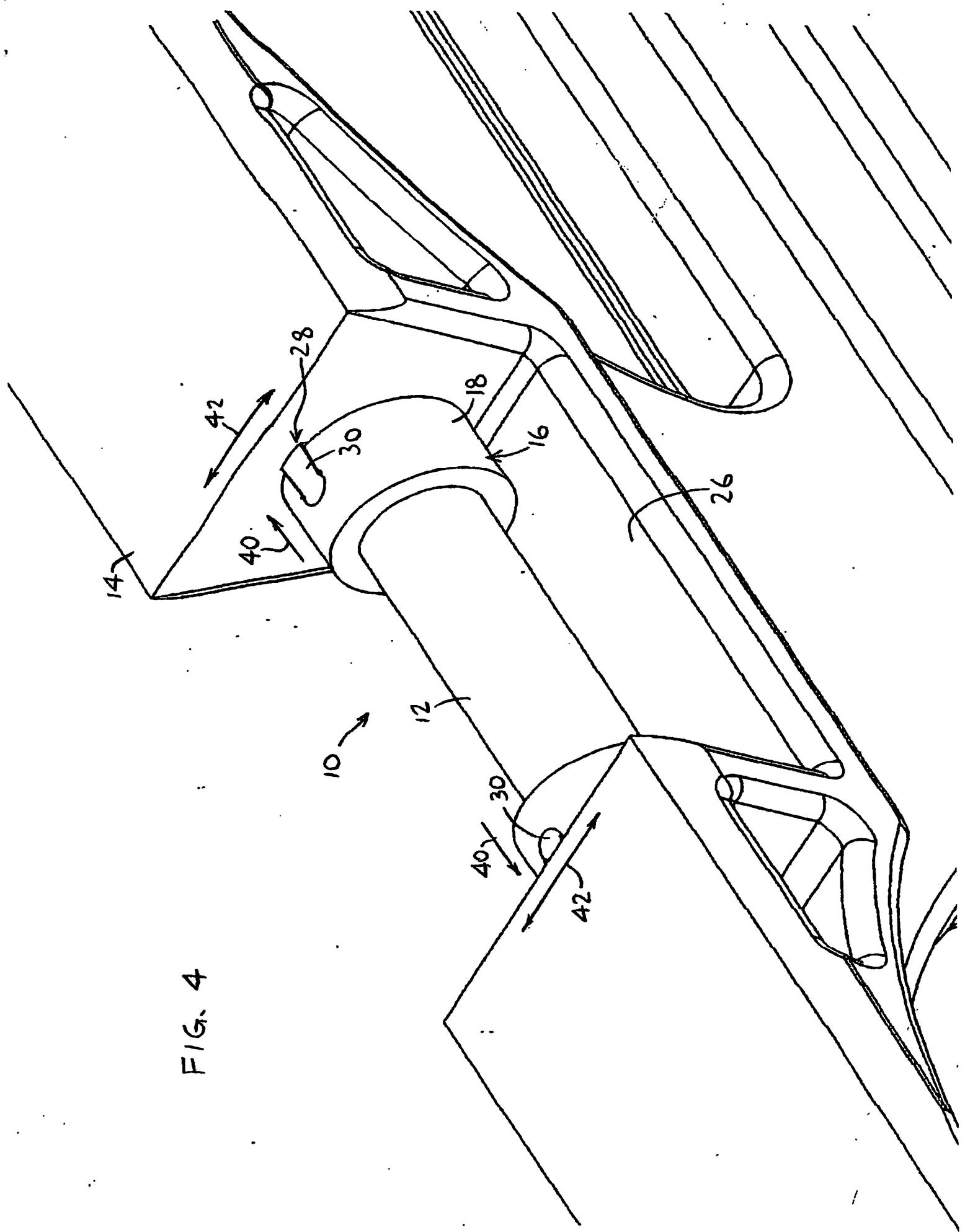


FIG. 3

FIG. 4



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